FRV Rigging Notes

This goes onto the CUGC website.

Rigging Rules

1. Never rig the glider unless you are **signed off** as authorised. If you are unsure, get help from an instructor or somebody else who is familiar with this Pegase.
2. Don't get distracted or interrupted during the rigging process, this is how you forget something.
3. Leave plenty of time to rig, and don't rush.
4. Always do a full DI and positive control checks before taking the glider to the launch point.
5. Always get a full briefing and read the flight manual before a conversion flight.
6. Always double-check the control connections. Another experienced pilot who wasn't involved in the rigging process should also check the connections before you fly. This should be confirmed in the DI book.

This is at least a two-person job, three if it's particularly windy, or you're not feeling confident. So don't be afraid to ask other people at the trailer park for help, especially when putting on the wings. But remember to always offer to help in return!

Opening the Trailer

1. Jack up the bogey wheel at the front of the trailer until the back of the trailer is **25cm** off the ground. If necessary you can also adjust the height of the legs at the back of the trailer using the tool in the front of the trailer (this will be necessary after having driven with the trailer).
2. Unlock trailer at front and back
3. Remove trestles and a wing dolly from the front of the trailer, and anything else that looks like it might impede the movement of the fuselage or wings. Be careful not to scratch the glider.
4. Move one trestle to each side at the back of the trailer, ready for the wings later.
5. Unlatch the trailer lid and open it fully using both handles. Lower the flap at the back of the trailer using the turning handle on the flap. (see photo)

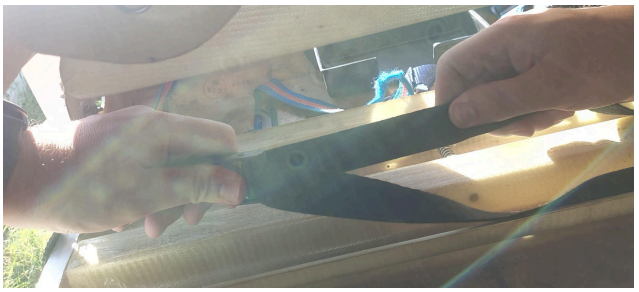
6. Cover trailer corners with the triangular carpet pieces that are attached to the trailer with rope.
7. Undo the black strap holding together the ramp components and tie the strap around the end of the fuselage where it meets the rudder (see photo below)
8. Pull out the ramp carefully. Make sure the ramp is pulled out fully but not so far that the ramp slides out of the rails, this is especially possible on the left-hand side of the ramp and is a pain to put back in. Be careful of the jack handle when pulling out the ramp. It must not hit the wing. Fold over the ramp ready for the fuselage wheel.
9. Make sure the jack is raised fully, then tuck the jack handle out of the way.
10. Add the auxiliary rail onto the central rail to allow the fuselage to be rolled out of the trailer without lifting. How the auxiliary rail is attached is shown in the photo below. There is a pin on the auxiliary rail (fabric side), that should be put into the hole on the central rail. Make sure this auxiliary rail is straight.

11. Undo the seatbelt that holds the tail down, and make sure it does not block any dollys' path.

Removing Fuselage

1. Roll the fuselage out of the trailer and down the ramp with a second person constantly checking clearance of the nose of the glider and the trailer. When needed, lift the tail by the black strap and continue until the belly dolly reaches the end of the ramp. **Be careful not to trip over the ramp as you pull out the glider and check that the dolly and wheels are engaging with the rails (especially the auxiliary rail).**

2. Remove the strap through the fuselage wing hole, the tennis balls, and the tail strap. Put the tennis balls and tail strap back into the front of the trailer, and **make sure the belly dolly strap is tucked away underneath the fuselage so it isn't a trip hazard**.

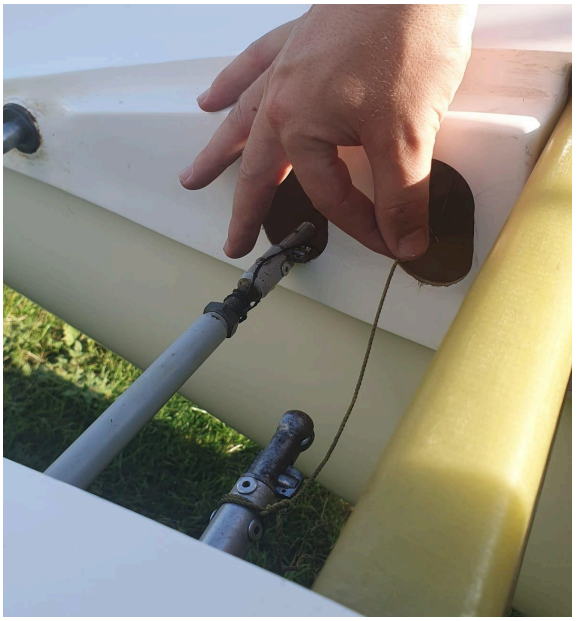


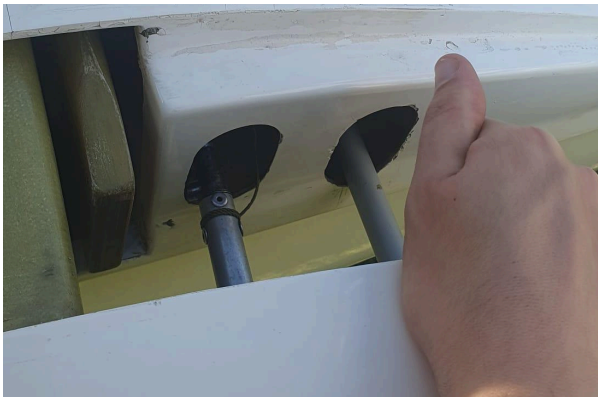
3. Ensure the straps for the battery (behind your head when sitting in the glider) are clear of the space for the wing roots.
4. Locate green rigging tool bag, which should be in the cockpit and make sure it contains the two main pins, the tail bolt, and the T red tool. Make sure the two main pins are suitably greased.
5. **Make sure airbrakes are unlocked in the cockpit**

Connecting the starboard (right) wing

Always rig with the right wing first (this has the fork). Person 1 is the person in charge of the rig.

1. Person 2 lifts the wing tip out of the trailer. **Mind the hazard of the wing hitting the pins on the fuselage or the edge of the trailer**.
2. Once fully out, person 1 lifts the root onto the trailer edge, on the corner carpet.
3. Person 2 walks out and forward with the wing so that they are standing perpendicular to the fuselage, while Person 1 makes sure that the wing stays on the corner carpet, and stops the operation if it's going to fall off.
4. Person 1 rotates the wing to be horizontal while maintaining it on the corner carpet while Person 2 accompanies the movement. Person 2 should be especially careful to **not exert any force on the ailerons during rotation**. Both should be extremely careful about not hitting anything else.
5. Person 1 lifts the wing from the corner carpet and places the spar in the corresponding hole in the fuselage. **Make sure that the fuselage doesn't wobble**.
6. Slide the wing inboard until the control rods are outside their corresponding holes. Person 1 positions the two safety pins attached by string so that they will slide into the fuselage and not hang in the gap between wing and fuselage. **Be careful when hands are between wing and fuselage, always tell person 2 to stop sliding while you fiddle with these pieces of string!**





7. Slide the wing in all the way. It is likely that person 1 will have to lift the trailing edge of the wing slightly. Person 1 instructs person 2 on whether they need to move the wing forwards/backwards/up/down so that it slides in flush. Make sure the gap between the wing is uniform and about 3-5mm.
8. After the wing has been slid in, check that neither safety pin is hanging underneath the wing, if this is the case, slide the wing out slightly and tuck the pins into the fuselage.
9. Person 1 places a trestle under the wing diagonally, close to the tip, such that the aileron is free to move.

Connecting the port (left) wing

Repeat as for the starboard wing but person 2 can remain at the tip instead of placing a trestle as jiggling will be required when inserting main pins. Check again that the wing/fuse gaps are even and haven't changed with the second wing going in. You may need to return to the first wing to push it back in slightly.

Inserting the main pins


Left: The main pins in, but not rotated and latched into place. Right: The pins rotated and latched into place.

Inserting the pins should be a quick and easy task taking less than a minute, if they are not going in the wings are not level and not aligned correctly. **Do not blindly force the pins in**; take a moment to step back and assess why it's not easy. Make sure you give your wing tip holder a rest if it is taking a long time (by placing a trestle underneath)!

1. Person 1 removes a pin from the green bag (they are interchangeable).
2. Look down the holes for the pins; you should be able to see if the holes line up or what needs doing to make them line up. Usually, person 2 on the port (left) wing needs to lift slightly.

In this photo, the right wing needs to be lowered.

3. Person 1 gives instructions to person 2 whether to move the wing up/down/forward/back. Keep checking that both wings are flush with the fuse.
4. Put the starboard pin in first
5. Put the port pin in.

6. Rotate the pins so that handles meet at the bottom and **lock them in place with the safety catch halfway between the pins**. You will need to pull the safety catch out and over both pin handles.
7. A trestle can now be placed under the port (left) wing and the two aileron locks can be removed from the ailerons and put in the front of the trailer.

Some people have success putting the first pin in halfway, then getting the second pin in, and returning to the first. Try this if you are struggling.

Lowering the glider and pushing back

1. Remove trestles from wings and Person 2 holds the wings level.
2. Remove the auxiliary rail and move it out of the way.
3. Ensure the main wheel doors are clear of the main jack, if not Person 1 can push and slide the glider slightly back on the main dolly.
4. Lower the main wheel and lock it using the cockpit main wheel control. Cycle the wheel up and down to check that it is serviceable as this is your only chance.
5. Person 1 lowers the ramp fully using the jack handle, again constantly checking that the nose of the glider is clear of the ramp and the trailer back. End result should look like the following photo
6. Gently push the glider backwards to be clear of the belly dolly and the main jack. Once that's done, one wing can be put to the ground

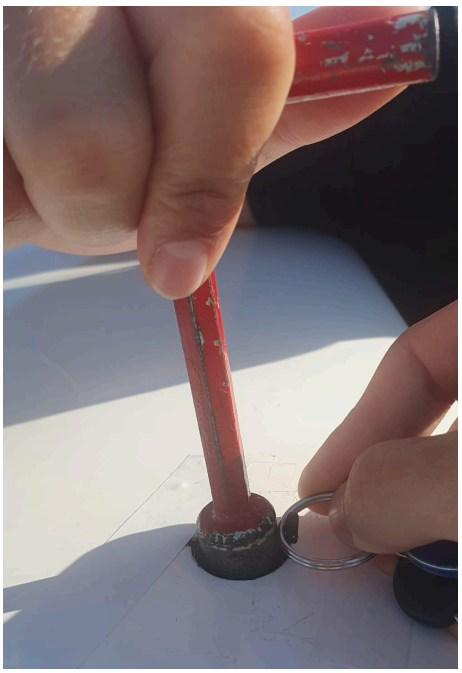
Connecting the tailplane

1. Collect the tailplane pin and red tightening tool from the green bag.
2. Push the wing root dollies to the back of the trailer, out of the way and check for trip hazards..
3. Person 1 & 2 stand in the trailer at each end of the tailplane, which is attached to the roof of the trailer.
4. Person 2 (at the back of the trailer facing forwards) supports the tailplane.

5. Person 1 (at the front facing backwards) pushes the handle on the roof mount to release the tail, making sure the tailplane doesn't drop but allowing the support to hinge down.

6. Slide the tailplane out and remove from the trailer, avoiding scratching the glider or tripping over the ramp.
7. Lower the tailplane onto the tail (putting the tailplane mount in the big square hole) and then push backwards firmly to lock in place. Ensure the elevator connection hooks in (see photo). Do not apply force if things aren't moving in.

8. Place the tailplane bolt into the tailplane, being careful with the metal locking loop (this can be pulled back out of the way by using a keyring for example).




9. Use the red tool to tighten the bolt until tight by hand (do not overtighten), then loosen until the wire loop slots in the next pin slot.
10. Check the tailplane is secure (wiggle it backwards and forwards and from side to side). Note that the 5mm gap between tailplane and tail is normal (see photo).
11. Return the red tool to the green bag.

Connecting the controls

This is a safety critical step. Check and double check control connections, as part of your DI you should also get another experienced pilot to check the connections.

1. Remove the fibreglass cover on the fuselage if not already removed (you can use the same red tool as is used for the elevator to open the flap).
2. There are four controls here that need connecting: 2x airbrakes (make sure airbrakes are unlocked in the cockpit) and 2x ailerons.
3. Connect each control by:

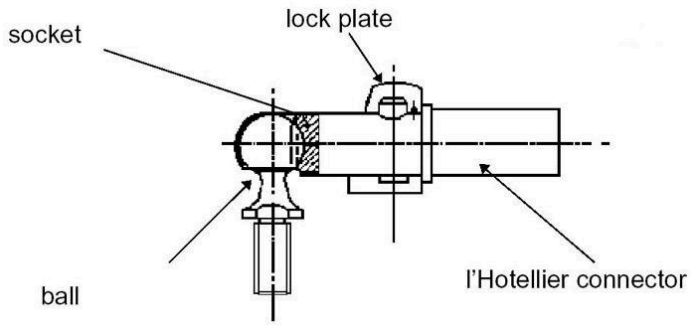
    1. Pulling down the connector
    2. Pushing the lock plate sideways through the connector
    3. Putting the socket over the ball
    4. Allowing lock plate to spring back
    5. Allowing connector to spring back
2. Roll and pull the connection around in your fingers and make sure it doesn't pop off when you gently pull it.
3. Once all four connections are complete the four safety pins must be inserted. There should be a small pin connected to each connector by a short piece of string. Find the pin and insert into

the small hole in the lock plate on each connector. The pin is an double-R pin with two gaps. The plate should rest in the first gap, do not exert excessive force to get it in the second gap as you might break or damage the pin. Repeat for the other three connectors.

4. Once controls are connected, leave the hatch opened for inspection later.
5. Slide the total energy tube (that can be found in the cockpit) into the hole in the tail and tape the connection.
6. Look for an authorised person to check your controls and sign for them in the DI book. After that, close and lock the cover panel.

Proper positive control checks are critical here.

Photo Below: Left connector with safety pin, right connector without



Install battery and parachute

The battery is stored in the battery room in the office and is marked CUGC. The parachute is in a black bag in the bottom of the main CGC 'chute cupboard.

1. The battery goes into the holder behind the pilot's head and is held in by straps. Make sure the battery isn't loose.
2. Plug battery wires into the connectors.

Over time the battery life declines. Inform the equipment officer if they are running out of juice early in the day.

Wing tape

You should always tape up:

1. The base of the total energy tube
2. Gap between the wing and the fuselage x2
3. Gap between the fin and the tailplane
4. Over the tail plane bolt (either side of the little metal loop)

Closing the trailer

1. Return trestles and anything else still lying around to the front of the trailer.
2. Remove the tow out gear from the front of the trailer and fit onto the glider.
3. Close the front of the trailer.
4. Slide ramp back into trailer and remove the carpet edges from the trailer corners.
5. Close both top and bottom of trailer carefully

At the launch point

1. Complete a cable release check on the relevant hook, before pulling the glider to the front of the queue

De-rig

In general, the de-rig is just the reverse of the rig, but here are some extra pointers:

Always wash the glider if it is at all dirty, especially the leading edges. Bucket and sponge are in the front of the trailer, and use the leather to dry.

1. Prep the glider as much as you can before pulling it onto the dolly in front of the trailer, which can be potentially in the way of other people derigging. You can take the tape off, tailplane, batteries, parachute, TE probe, and undo the four connectors (remember to remove the safety pins first) all before you get to the trailer.
2. Have the ramp in the fully lowered position
3. Before bringing the fuselage onto the belly dolly, make sure you remove the tail dolly. The fuselage should be dragged onto the belly dolly so that the trailing edge of the dolly is 0 to 2 centimetres away from the leading corner of the blue weak link triangle on the side of the fuselage (see photo in lowering the glider section). You may need to put your foot in front of the belly dolly to stop it rolling forward while you pull the glider. I usually get the aircraft lined up in front of the trailer, remove the tow out gear but leave the wing dolly then. I can then drag the glider forwards onto the dolly myself.
4. Once on the dolly, raise the ramp fully with the jack handle, store the handle away so that it isn't a trip hazard and insert trestles under both wings.

5. Make sure the trailer is ready with wing dollies at the back of the trailer and nothing in the way of where the wings will have to go. Put the aileron locks back onto the ailerons. Do all of this 'before' you ask for help.
6. Take the left wing off first, as the exact reverse of the rig. The control rods and pins need to be lifted to avoid being stuck in the fuselage when removing the wing. The pin on the trailer wing dolly goes into the spar hole closest to the wing root. Roll wing in gently, taking care to remain clear of the corner of the trailer (which should be covered in carpet) and the lugs on the fuse (which you could cover with tennis balls). The dolly will hit a physical stop at the front of the trailer.
7. Repeat with the right wing.
8. Continue to de-rig by following reverse order of rigging instructions. Make sure the fuselage is upright before pushing it into the trailer
9. Before attempting to close trailer check that:

    - Ramp is stowed
    - Wings are slid fully forwards
    - Carpet removed from trailer corners.
    - Tail wheel is properly located in depression in base of trailer
    - Nothing in the front of the trailer will foul the lid when you close it
    - Everything that’s going to be stored in the front goes into the trailer: trestles, wing-wheel, tail-dolly, tow-bar.

    1. Lower the lid of the trailer carefully, stopping if you feel resistance. Check the wing tips go in the carpet slots in the lid.
    2. Close the back flap and the front door. The back flap can be tricky if not properly aligned.
    3. Check you haven't left anything laying around the trailer.

Parking the Trailer

The trailer should be parked into wind where possible, making sure that there are no obstacles, for example in the form of other trailers, that will inhibit the ability to put the wings on the glider. When parking, attach the hitch to the permanent ball in the parking location. Make sure the handbrake is left **off**. Lower the rear stabilisers until they take the tension.

Towing the trailer/preparing for XC

This is not a comprehensive guide, just some things to think about.

If you are going to go XC in FRV, you must make sure the trailer is serviceable before you set off.

A standard check of the trailer includes:

- Tyres: Have you checked their pressure? When were they last changed? Are they cracked?
- Brakes: Does the handbrake work? Are the brakes adjusted correctly, i.e. do they apply as the trailer decelerates?
- Electrics: **This is a must.** Do all the lights work? You have to test this.

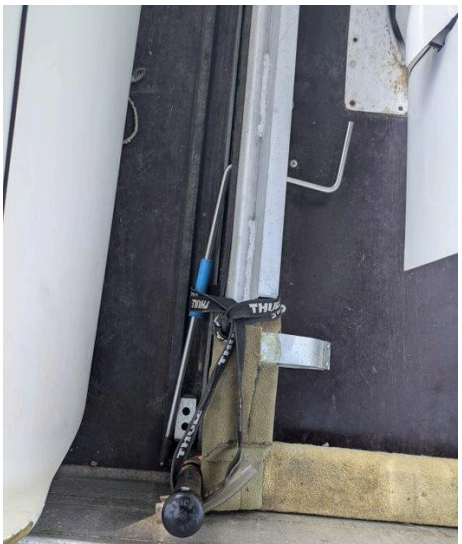
If you are intending to tow FRV, here are some things to think about:

- Experience: Have you towed before? If not, then you **definitely** should practice around the airfield doing manoeuvres and some reversing in case you get stuck on the roads.
- Car: Is it powerful enough? What is the weight relationship between car/trailer? Do you have electrics? Have you got a number plate to put on the trailer?
- Licence: With a UK category B car license, you can tow up to 3500 kg MAM (Maximum authorised mass).
- Insurance: Are you insured for trailer towing? Is the glider insured on the road?

A checklist for if you, or someone else, has to tow the trailer:

1. Is the glider secure?

    i. Tail strapped down using seat belt attached to trailer floor
    ii. Tailplane secure under roof of trailer, with sponge between the tailplane and the support to stop it moving.
    iii. Wings securely on dollies and in holders on the trailer floor.



iv. No loose items in trailer such as extra trailer ramp element and jack handle(should be attached to normal ramp as shown in photo)
v. Everything looking good in the front of the trailer, with nothing touching the wing in a way that could damage it (e.g. trestles). If in doubt, transport these items in the car instead.

2. Make sure to bring all the tools/parachute/battery you need.
3. Make sure to raise the legs at the rear of the trailer.
4. Attach the car's number plate to the rear of the trailer.